REMARKS/ARGUMENTS

Reconsideration is requested of all rejections based on objections to the abstract:

A new abstract that conforms to the guidelines provided by examiner has been provided.

Reconsideration is requested of the rejection of claims 3 and 27 under 35 U.S.C. 112:

In response to examiner's remarks concerning 'indefiniteness', the wording of these claims is now limited to simple Markush format.

Reconsideration is requested of the rejection of claims 1, 3, 25, and 27 under 35 U.S.C. 102(e) as being anticipated by Fontana et al.

Regarding claims 1 and 25, examiner argues that Fontana teaches a "thermally conductive" pedestal 60 that "extends upwards from the substrate 27". Fontana's pedestal 60 is actually the extension of lower magnetic pole P1. It is required to be ferromagnetic but there is no requirement that it be a good thermal conductor either in reality or as taught by Fontana. It is also inaccurate to state that pedestal 60 extends upwards from the substrate. Its upward extension is from insulating layer 50. If no distinction is to be made between "extending from layer 50" and "extending from substrate 27" then it could just as well be argued that pedestal 60 extends upwards from the center of the earth, rendering any qualification of the form "from layer X" to be meaningless.

Examiner then argues that thermally conductive seed layer 92 connects pedestal 60 to coil 94 (note that the coil is actually element 106, 94 being the material from which the coil is later formed). This argument is not understood since seed layer 92 is an integral part of coil 106 which is a far better thermal conductor than seed layer 92 since the latter is, innately, very thin). However, coil 106 (including seed layer 92) is both thermally and electrically isolated from pole P1 (by insulating layer 70) and cannot easily transfer heat into it (which is the problem that is solved by the present invention!).

Regarding claims 3 and 27, Fontana does not teach the use of tantalum and/or copper for any purpose other than as a seed layer.

Reconsideration is requested of the rejection of claims 1, 3, 4, 25, 27, and 28 under 35 U.S.C. 102(b) as being anticipated by Jensen et al.

Unlike Fontana, the Jensen invention does attempt to solve the coil overheating problem. It does so, in part, by underlying the coil with layer 532 made of a remarkable material – one that, **in thin film form,** is both a good electrical insulator and a good thermal conductor. The preferred materials for this layer are stated to be aluminum nitride or silicon nitride whose thermal conductivities **when in bulk form** approach the values cited by Jensen. This high thermal conductivity (for an insulator) is achieved, in the bulk material, through lattice conduction. Were it otherwise they could not be good electrical insulators. However, when laid down as thin films, unless epitaxially formed as single crystals, good lattice conductivity no longer possible.

Quite aside from the inoperability of this portion of the Jensen invention, there is no teaching by Jensen of how the heat absorbed by layer 532 is to be removed from the vicinity of the coil. As can be seen in figure 5, this absorbed heat must pass through lower pole 512, dielectric layer 508, and lower shield 510 before reaching substrate 506. The two "pedestals" 522 and 524, cited by examiner extend only as far as layer 518.

Unlike the present invention, there is no thermal short circuit (to convey heat directly to the substrate) equivalent to that provided by our pedestal 23.

In order to remove any possibility of interpreting the phrase "extending upwards from" to mean "extending from above" we have amended both claims 1 and 25 which now read as follows:

1. A method to dissipate heat generated by a coil located within a micro-structure, that is on a substrate, comprising:
forming a thermally conductive pedestal that extends upwards from said substrate; and
forming a layer that thermally connects said coil to said substrate through said pedestal.

25. A heat extractor for a micro-structure that includes a coil and a substrate, comprising:
a thermally conductive pedestal that extends upwards from contact with said substrate; and
a layer that thermally connects said pedestal to said coil.

Reconsideration is requested of the rejection of claims 2, 5, 6, 26, and 29 under 35 U.S.C. 103(a) as being unpatentable over Jensen et al.

Regarding claims 2 and 26, examiner argues that it would have been obvious for one skilled in the art to select an insulating material having a thermal conductivity in the range recited in claims 2 and 26. With the greatest respect we dispute this statement on the grounds that no such material exists in deposited film form. We request that examiner provide us with an example of a material that, in thin film form, has been reported to be both a good electrical insulator and to have a thermal conductivity in the range 100 to 400 W/m.K.

Applicant respectf ully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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